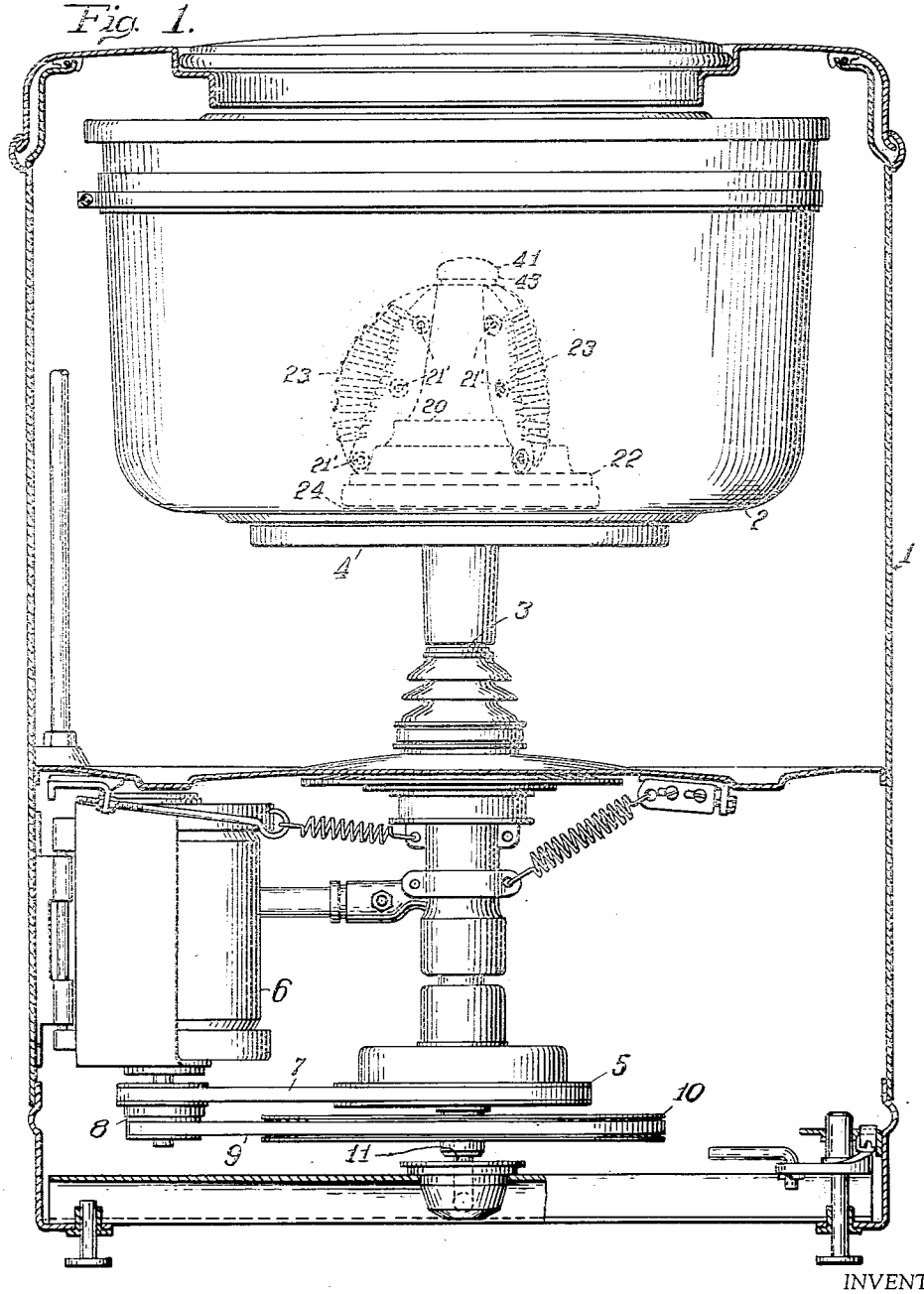
Aug. 16, 1955 A. W. ALTORFER, JR 2,715,330

CLOTHES WASHING MACHINES

Filed March 20, 1952 2 Sheets-Sheet 1

Fig. 1.



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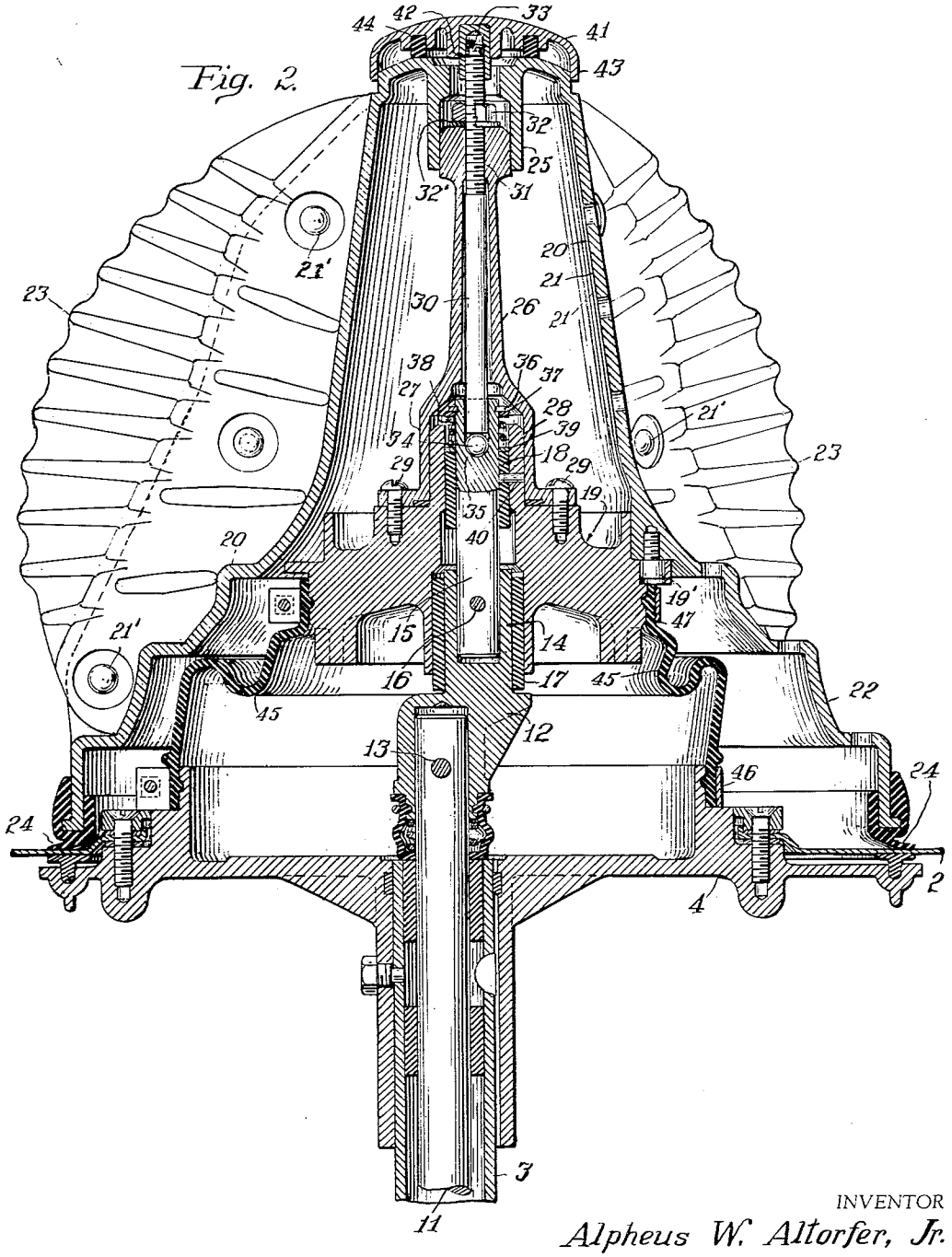
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Fig. 2.



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CLOTHES WASHING MACHINES

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Application March 20, 1952, Serial No. 277,617

8 Claims. (Cl. 68—131)

This invention relates to improvements in clothes washing machines and particularly to the type of washing machine set forth in the prior application of Alpheus W. Altorfer, Jr., and John A. Castricone, Serial No. 186,806, filed September 26, 1950.

In the aforesaid patent application, the washing machine is constructed with a dasher so mounted on a drive shaft as to be moved in an orbit upon operation of the shaft in accomplishing a washing action in the tub of the machine. The dasher was mounted in an offset relation with respect to the drive shaft by a crank member and a journal pin.

The dasher preferably has a close fit with the bottom of the tub so as to exclude the clothes therefrom during the washing action and to prevent the clothes from getting lodged between the lower edge of the dasher and the tub. A gasket is provided ordinarily on the bottom of the dasher to maintain a tight fitting relation with the tub when the parts are in their proper operative positions. However, in building these machines, there is a considerable allowance for tolerance between the operative parts and it is therefore difficult to maintain the proper sealing action between the dasher and the tub. Moreover, due to variations in fitting of the different parts of the dasher mounting and driving means, noise and squeaks sometimes develop, which are undesirable.

One object of this invention is to improve the mounting of the dasher in the washing machine tub so as to eliminate the foregoing objections and to ensure of proper operation thereof upon rotation of the drive shaft connected therewith.

Another object of the invention is to provide for an adjustment of the position of the dasher with respect to the drive shaft and tub so as to give proper clearance at the bottom of the dasher while maintaining a proper liquid tight joint between the parts and a close fit of the rubber gasket at the bottom of the tub.

Still another object of the invention is to improve the mounting of the dasher on the drive shaft so as to provide for smooth operation thereof, eliminating noise and squeaks with proper liquid tight seal of the operating parts of the mounting, when the machine is finally completed in operative relation.

These objects may be accomplished by providing a connecting rod assembly between the dasher and the head on which it is mounted, for axial adjustment of the dasher in a very simple and ready manner after it is assembled in the tub and connected with the drive shaft. The connecting rod is tubular and has a shaft extending therethrough for bodily adjustment of the dasher and its mounting head axially with respect to the offset pin or crank by means of which the dasher is operated. These parts provide not only for axial adjustment of the dasher, but also take up for variations between the parts in manufacture, thereby eliminating undesirable noise during the operation of the machine. Moreover, the adjustment of the dasher bodily ensures

of the maintenance of proper fit between the lower edge of the dasher and the bottom of the tub.

The invention is illustrated in one embodiment in the accompanying drawings in which:

Fig. 1 is a vertical sectional view through a washing machine to which this invention is applied, with parts in elevation; and

Fig. 2 is a cross section through the dasher and its mounting.

The invention is shown in Fig. 1 as applied to a washing machine of the character set forth more in detail in the above mentioned application, Serial No. 186,806, filed September 26, 1950, to which reference may be had for more complete disclosure of the general structure and characteristics of said machine.

The washing machine includes a main casing generally designated at **1**, within which is mounted a rotary tub **2**, carried by a tubular shaft **3** connected with the bottom of the tub **2** by means of a casting generally indicated at **4** and shown more in detail in Fig. 2.

The tubular shaft **3** is driven by a pulley **5**, operatively connected with the lower end thereof, from a power motor **6**, by means of a belt **7**.

The motor **6** is mounted within the casing **1** and carries a pulley assembly **8** on the armature shaft thereof, which pulley assembly **8** is connected also by a belt **9** with a pulley **10**, mounted on a drive shaft **11** that extends upwardly through the tubular shaft **3**, as shown in Fig. 2. The drive shaft **11** is adapted to operate the dasher for washing clothes, while the tubular shaft **3** is operated to rotate the tub **2** for removing water therefrom in drying the clothes.

The drive shaft **11** extends into the lower end of the tub **2** and carries on its upper end an offset crank member **12** secured as by a pin **13** to the shaft **11**. The crank member **12** has an offset sleeve portion **14** out of axial alignment with the shaft **11** for bodily movement around the axis of the shaft upon rotation of the latter. A crank pin **15** is inserted into the sleeve portion **14** and secured rigidly therein as by a locking pin **16**.

A bearing sleeve **17** surrounds the sleeve portion **14**, and a second bearing sleeve **18** surrounds the crank pin **15** at a point adjacent the upper end thereof.

A head is designated generally at **19** and usually is in the form of a casting made of plastic or other suitable material. The head **19** surrounds the crank pin **15**, being journaled on the bearing sleeves **17** and **18** for freedom of turning movement relative to the crank pin and crank member **12**, a portion of the head **19** extending down around the sleeve portion **14** in bearing relation therewith.

The head **19** supports a dasher generally designated at **20**, which is seated on the head and while not positively secured thereto, is held in alignment therewith by pins **19'** connected with the dasher and extending into openings in the head.

The dasher **20** has a long tapered frustro-conical body portion, designated at **21**, with a widely flaring lower portion **22**, formed of metal, plastic, or other suitable material. The body **21** is provided with flexible vanes **23** thereon adapted to function for washing clothes as described more fully in the above-mentioned application. The vanes **23** are transversely ribbed and are secured by fastenings **21'** to integral blades on the dasher.

The lower portion of the dasher **20** has a gasket **24** mounted thereon, usually of rubber, to fit fairly close to the bottom of the tub **2** to exclude articles of clothing from access to the operating parts of the mechanism. The dasher preferably is in such relation to the bottom of the tub in normal operation that the rubber gasket **24** is deflected laterally, as illustrated in Fig. 2, where the

resiliency of the gasket will maintain the latter in sealing relation with the bottom of the tub.

The body portion **21** of the dasher **20** has an inturned sleeve portion **25**, which is open at the top of the latter. A connecting rod **26** has a bell-shaped lower portion **27** telescoped over a sleeve portion **28** on the head **19**, into a seated position against the top of the head. Cap screws **29** may be used to secure the bell portion **27** rigidly to the head **19**. The upper end of the connecting rod **26** extends into the sleeve portion **25** of the dasher, as shown in Fig. 2.

A tie rod **30** extends through the tubular connecting rod **26**, and has a threaded connection with the upper end portion thereof at **31**, for axial adjustment of the tie rod **30** relative to the tubular connecting rod **26**. The upper end portion of the tie rod **30** is externally screw-threaded and adapted to receive thereon a lock nut **32**, adapted to bear against a rubber gasket **32'** on the upper end of the connecting rod **26**. A screw driver slot **33** is formed in the extreme upper end of the rod **30** adapted to receive a screw driver for turning the latter for adjustment of the parts.

The lower end of the rod **30** bears upon a ball **34** seated in a cavity **35** formed in the upper end of the crank pin **15**.

The crank pin **15** has a split spring ring **36** secured in a surrounding groove therein, against the lower side of which spring ring is seated a bearing plate **37**. A coil spring **38** is interposed between the plate **37** and a bearing plate **39** seated upon the upper end of the sleeve bearing **18**. The sleeve bearing **18** is secured by a pin **40** to the sleeve portion **28** of the head **19**.

It will be apparent that the crank pin **15** is fixed axially relative to the drive shaft **11**, but can move in an orbit about the latter. The lower end of the tie rod **30** is seated upon the ball **34** carried by the crank pin **15**. The tie rod **30** supports the connecting rod **26** and the head **19**. The bearing sleeve **18** being pinned to the head **19**, has spring tension applied thereto by means of the spring **38** normally tending to urge the head downward relative to the crank pin **15**. However, upon turning of the tie rod **30**, the connecting rod **26** may be adjusted axially up or down, and thereby acting through the head **19** to adjust the axial position of the dasher **20**. The spring **38** normally tends to urge the dasher downward relative to the crank pin **15**, and the drive shaft **11**.

When these parts are assembled in the washing machine tub **2**, there is often some play and clearance between the operating parts as a result of tolerance in the manufacture thereof. However, by adjusting the tie rod **30**, the relative disposition of the parts may be varied to take up the slack and thereby eliminate noise and squeaks as a result of the operation of the machine.

At the same time the dasher **20** should be bodily adjusted so as to move the gasket **24** into proper sealing relation with the bottom of the tub **2**, thereby preventing the entrance of articles of clothing into the region of the center of the tub. The adjustment should be such as to deflect the rubber gasket, substantially as shown in Fig. 2, to maintain tension on the bottom of the tub during the operation of the dasher.

A cap plate is shown at **41** screw-threaded at **42** on the upper end of the tie rod **30**. This cap plate may be applied after the adjustment has been made and it will serve also to retain the dasher removably on the operating mechanism since a sliding fit is provided between the sleeve portion **25** and the upper end of the connecting rod **26**, whereby the dasher fits loosely upon the operating mechanism and may be removed bodily therefrom after removal of the cap plate **41**. The cap plate **41** has a skirt portion **43** that fits around the upper end portion of the dasher and is provided also with a friction gasket **44** therein to prevent the loosening of the cap.

A flexible rubber sleeve **45** surrounds the upper end portion of the drive mechanism inside the dasher **20**. The

sleeve **45** is secured by a surrounding clamp **46** to the tub center casting **4**, and by a surrounding clamp **47** to the head **19**. The effective sealed relation thus is maintained around the operating parts to exclude water therefrom and from the drive column at the center. At the same time, the sleeve **45** serves to retain the dasher **20** against bodily rotation on its axis **15** since it is held resiliently by the sleeve **45** against such turning movement. It has been found that additional means to control the rotation of the dasher on its axis is unnecessary when a sleeve of this character is used.

The operation of the washing machine will be apparent from the above mentioned application, with little additional explanation necessary. The water and clothes are placed in the tub **2** for washing. The operation of the motor **6** drives the shaft **11**, and through a slip clutch connection the tub **2** and its tubular shaft **3** are not driven during this washing action.

The crank motion provided by the crank pin **15** moves the dasher **20** through an orbit as the shaft **11** is rotated, and this continues until the washing action is completed. Then upon operation of the motor **6** in the opposite direction, both shafts **3** and **11** are power driven to spin the tub **2** and expel the water from the clothes, as described in the above-mentioned application.

The other details of the washing machine are not described or illustrated herein, but will be apparent from the above mentioned application.

While the invention has been illustrated and described in one embodiment, it is recognized that variations and changes may be made therein without departing from the invention as set forth in the claims.

I claim:

1. In a washing machine, the combination of a drive shaft, a dasher, a crank pin carried by the drive shaft, a head connected with the dasher and slidably mounted on the crank pin and supporting the dasher, a spring interposed between the crank pin and the head and bearing thereagainst normally tending to move the head in one direction relative to the crank pin, and means forming an axially adjustable connection between the head and the crank pin.

2. In a washing machine, the combination of a drive shaft, a dasher, a crank pin carried by the drive shaft, a head connected with the dasher and slidably mounted on the crank pin, a spring interposed between the crank pin and the head and bearing thereagainst normally tending to move the head in one direction relative to the crank pin, a connecting rod secured to the head and extending upwardly therefrom in the dasher, a tie rod supported on the crank pin and extending through the connecting rod, and means forming an axially adjustable connection between the connecting rod and the tie rod.

3. In a washing machine, the combination of a drive shaft, a crank member on the drive shaft, a dasher having an elongated tubular body portion and surrounding the drive shaft, a crank pin carried by the crank member and offset from the axis of the drive shaft, said crank pin having a recess in the upper end thereof, a ball seated in the recess, a tie rod extending into the recess and seated on the ball, a head slidably mounted on the crank pin for axial movement relative thereto, a coiled spring surrounding the crank pin and interposed between the crank pin and the head and bearing thereagainst normally tending to move the latter in one direction relative to the crank pin, said head supporting the dasher, a connecting rod secured to the head and extending upwardly therefrom around the tie rod, means forming a screw-threaded connection between the tie rod and connecting rod, a sleeve on the dasher surrounding the connecting rod, and a cap screw-threaded on the upper end of the tie rod and enclosing the upper end of the dasher.

4. In a washing machine, the combination of a drive member, a dasher, a head surrounding the drive mem-

ber and axially movable relative thereto, a coiled spring surrounding the drive member and interposed between the drive member and the head normally tending to move the latter in one direction axially relative to the drive member, means for connecting the dasher with the head, a support on the driven member, and means forming an adjustable connection between the support and the head for adjusting the support and dasher relative to the drive member axially thereof in opposed relation to the spring.

5. In a washing machine, the combination of a drive member, a dasher, a support for the dasher surrounding the drive member and axially movable relative thereto, resilient means interposed between the support and the drive member and normally tending to move the dasher in one direction relative to the drive member, and means connecting the dasher with the drive member and adjustable axially of the dasher.

6. In a washing machine, the combination of a drive shaft, a crank pin connected with the drive shaft in offset relation thereto, a head surrounding the crank pin and journaled thereon, a dasher having a lower portion connected with the head and having an upper portion projecting above the head and the crank pin, a rigid member extending upwardly in the dasher with a lower end portion of said member connected with the head and with an upper end portion thereof connected with the upper portion of the dasher, and means seated on the upper end of the crank pin and supporting said member thereon.

7. In a washing machine, the combination of a drive shaft, a crank pin connected with the drive shaft in offset relation thereto, a head sleeved over the crank pin, a dasher supported on the head and surrounding the head and the crank pin and having a portion extending to a point above the crank pin, a sleeve member connected

with the head and surrounding the crank pin and extending upwardly to a point above the upper end of the crank pin, and means seated on the upper end of the crank pin and connected with said sleeve member for supporting the head, and means connecting the upper end portion of the sleeve member with the upper end portion of the dasher.

8. In a washing machine, the combination of a drive shaft, a crank pin connected with the drive shaft in offset relation thereto, a head surrounding the crank pin and journaled thereon, a dasher having a lower portion connected with the head and having an upper portion projecting above the head and the crank pin, a rigid member extending upwardly in the dasher with a lower end portion of said member connected with the head and with an upper end portion thereof connected with the upper portion of the dasher, means seated on the upper end of the crank pin and supporting said member thereon, and means for adjusting the dasher axially relative to said upwardly extending member while maintaining the connection between the dasher and the head.

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